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NOTES ON COLLECTING SYRPHID FLIES (DIPTERA: SYRPHIDAE)[1]

HOWARD V. WEEMS, JR.
Department of Zoology and Entomology, Ohio State University

Syrphid flies can be collected in many kinds of habitats—some where they feed at flowers, some in places where they oviposit, and others in places where they hover in sunlight or rest on foliage. Many species are restricted in their distribution to particular types of habitats, such as grassy fields, open woods, bogs, or stream margins. Some are found only in mountainous areas, others in deserts, and still others in swampy areas. In collecting for syrphids the old adage holds well that if one wishes to find unusual species he should visit unusual places.

Some of the factors which determine what syrphids can be collected are season, geographic area, habitat, time of day, temperature, wind conditions, and availability of food and satisfactory oviposition sites. For example, the distribution of a plant whose flowers are favored by syrphids often does not coincide with the distribution of a particular species of syrphid, or a plant which otherwise might be an excellent host does not bloom at the same time that certain species of syrphids are present. Many species of syrphids feed only at certain times of the day. They are most evident on calm, warm, sunny days. Few of them fly at temperatures below 60° F.

HOST PLANTS OF SYRPHID FLIES

Most syrphids can be collected best at the flowers they frequent. The flowers which provide the best collecting vary from one area to another, and a given flower may differ in value for collecting syrphids in different places. The flowers of redbud (*Cercis canadensis* L.) attracted large numbers of syrphids of several species at Gainesville, Florida, but yielded only occasional syrphids at Oxford, Mississippi, and practically none at several places in Ohio. Two species of wild plum (*Prunus americana* Marsh. and *Prunus angustifolia* Marsh.) were present in all these areas; in north Florida wild plum was a fairly good host

[1] Names of plants are those used in the new Gray's Manual of Botany (Fernald, 1950); for those Florida plants not included in Gray's Manual, Small's *Manual of the Southeastern Flora* (1933) is followed.

plant; in Mississippi it was decidedly the best, but in parts of Ohio it yielded only the common species, attracting Hymenoptera mostly. Williston (1886) recorded that patches of elder (*Sambucus* L.) in bloom will always be sure to reward the patience of the collector. Curran (1924) wrote that he found not more than a dozen species on elder, most of them common, and he considered it to be a poor host plant. In various places in Florida I failed to find more than an occasional syrphid on elder, although syrphids were abundant in areas where the plant was in bloom. I made similar observations in Georgia, Mississippi, and Ohio, but on July 4, near Richwood, West Virginia, I collected a large number of syrphids on elder (*Sambucus pubens* Michx.). Mountain hydrangea (*Hydrangea arborescens* L.), blooming in the same area, produced many more specimens of a greater number of species, but I obtained several species on elder which I failed to take on the hydrangea where the two plants were less than twenty feet apart. This points up the importance of checking possible host plants many times in many places until experience shows them to be unattractive to syrphids.

A few species of syrphids exhibit high host specificity. *Rhingia nasica* Say visits almost exclusively the spotted flowers of pale touch-me-not (*Impatiens pallida* Nutt.). Most syrphids feed at many kinds of plants, although some feed mainly at flowers of plants within a particular family.

Several collectors have recorded that syrphid flies are found chiefly upon white flowers, only a few species commonly visiting blooms of other colors. While white and yellow flowers often attract large numbers of syrphids, the plants which attract the largest numbers of syrphid flies in some areas are those with inconspicuous greenish or yellowish green flowers. Spicebush (*Lindera benzoin* [L.]) yielded a good variety and large numbers of syrphids in early spring collecting in Ohio. Arborvitae bloom near Atlanta, Georgia, yielded many *Syrphus* and *Metasyrphus* in early spring. Filmy angelica (*Angelica curtisii* Buckl.) was visited by hundreds of *Stenosyrphus cinctellus* (Zett.) near Cranberry Glades, West Virginia, during a drizzling rain in mid August. At the same time many other species in the same area were attracted chiefly to the white flowers of cowbane (*Oxypolis rigidior* [L.]), which was growing in large patches in a sphagnum-cranberry bog. Only a few *Stenosyrphus cinctellus* (Zett.) visited the flowers of cowbane. The greenish flowers of poison sumac (*Rhus vernix* L.) and other sumac (*Rhus* spp.) attract

many Syrphidae, Stratiomyiidae, and Conopidae. The clusters of tiny green flowers of poisonwood (*Metopium toxiferum* [L.]), on the Florida islands from Key Largo to Key West, in March and April, yielded large numbers of *Baccha notata* Loew and *Allograpta cubana* Curran, two species of syrphids described from Cuba which once were believed to be rare in Florida. Other specimens of these species were taken at the inconspicuous greenish yellow flowers of *Trema mollis* (Humb. & Bonpl.) in the same area. It is often especially helpful, when collecting syrphids against predominantly green background, to station oneself so that syrphids hovering or flying about the flowers are silhouetted against the sky. Some of the *Baccha* are almost impossible to detect and catch otherwise, and are often overlooked entirely. I failed to take a single specimen of the elusive *Baccha cubana* Hull during numerous collecting visits to Highlands Hammock State Park, Florida, until I learned this trick. The first time that I tried stooping low and looking upward through the vegetation, within half an hour I had taken a dozen specimens of this beautiful and seemingly rare syrphid.

Spanish needle (*Bidens bipinnata* L.), a common roadside herb throughout the peninsular Florida, blooms sporadically at all seasons and produces small flowers with white petals and a yellow center. This plant is the best syrphid fly host in Florida. Dahoon holly (*Ilex cassine* L.) is an excellent host in March and April for many uncommon Syrphidae in Florida hammocks. The bright yellow bloom of *Flaveria linearis* Lag. is the best host of *Ornidia obesa* (Fab.), *Volucella nigra* Greene, and several species of *Eristalis* in the Florida keys. Other good host plants in Florida include Carolina laurel cherry (*Prunus caroliniana* [Mill.]), gallberry (*Ilex glabra* [L.]), *Osmia odorata* (L.), *Trema mollis* (Humb. & Bonpl.), poisonwood (*Metopium toxiferum* [L.]), marsh willow (*Salix longipes* Shuttlow.), Mexican sunflower (*Heliopsis helianthoides* [L.]), titi (*Cyrilla parvifolia* Raf.), wild plum (*Prunus* spp.), mango (*Mangifera indica* L.), avocado (*Persea persea* [L.]), sporadic citrus bloom, and a variety of tropical fruit trees and shrubs. During two years at Gainesville, Florida, I experienced fair collecting at blooms of pear (*Pyrus communis* L.) from early October into the first week of November.[2]

[2] This fall bloom is abnormal and is due to shedding of foliage in late summer, caused by a fungus disease (*Fabraea maculata* [Leb.]) known as leaf spot. Pear blooms in the spring.

Good syrphid host plants in mountainous areas include New Jersey tea (*Ceanothus americanus* L.), pogoda cornel (*Cornus alternifolia* L.), silky dogwood (*Cornus amomum* Mill.), mountain hydrangea (*Hydrangea arborescens* L.), sugar maple (*Acer saccharum* Marsh.), mountain maple (*Acer spicatum* Lam.), winterberry (*Ilex verticellata* [L.]), juneberry (*Amelanchier* spp.), sumac (*Rhus* spp.), hawthorn (*Crataegus* spp.), raspberry and blackberry (*Rubus* spp.), aster (*Aster* spp.), goldenrod (*Solidago* spp.), spirea (*Spiraea* spp.), and several species of wild plum and wild cherry (*Prunus* spp.). Most of these plants also offer good collecting where they occur at low elevations.

Wild plum thickets, especially where they occur on the edges of woods, offer excellent syrphid collecting throughout most of the Southeastern States. Several species of wild plum which occur typically in open woods yield many unusual syrphids. Collecting near Oxford, Mississippi, at a single woodland plum in an open sunny spot in a wood resulted in the capture of several additions to the list for that state. Other plants in the genus *Prunus* are among the best syrphid hosts, particularly wild black cherry (*Prunus serotina* Ehrh.) and choke cherry (*Prunus virginiana* L.), which attract many early-flying species. Blossoms of cultivated plum (*Prunus domestica* L.), cherry (*Prunus* spp.), apricot (*Prunus armeniaca* L.), apple (*Pyrus malus* L.) are all good host plants for syrphids, especially where one or a few trees occur near a woods. Phillips (1933) listed 21 species of syrphids which he collected on apple blossoms in western New York. Peach bloom (*Prunus persica* [L.]) does not appear to be attractive, although I have taken a few syrphids at peach bloom. Curran (1924) recorded similar data.

During the last few days of March and the early part of April, while the weather is still crisp, large hairy *Criorhina* can be taken at willow bloom (*Salix* spp.), and are seldom seen at any other time of the year. Flowering dogwood (*Cornus florida* L.) is fairly good sometimes, but usually it blooms in such quantity that the syrphids attracted to it are scattered over too large an area, and they often alight on blossoms completely out of reach from the ground, thus making this plant a poor one for collecting. Occasionally an isolated tree with low branches yields fair collections.

Sassafras (*Sassafras albidum* [Nutt.]) in woods, fields, and along roadsides is a good syrphid host in spring. Fields of wild

parsnip (*Pastinaca sativa* L.), cow parsnip (*Heracleum maximum* Bartr.), and wild carrot (*Daucus carota* L.) yield enormous numbers of common species of syrphids, and occasionally uncommon species.

Grasses (Gramineae), plantain (*Plantago* spp.), and dandelion (*Taraxacum* spp.), when in bloom, are visited by many species of *Mesograpta* and *Platycheirus*, where they are readily collected by general sweeping with a net.

Other collectors have recorded collection of Syrphidae at a wide variety of host plants. Curran (1924) listed basswood (*Tilia*), marsh marigold (*Osmorrhiza claytoni* [Michx.]), swamp rose (*Rosa carolina* L.), strawberry (*Fragaria*), and cultivated gooseberry (*Grossularia*) among the syrphid hosts. Bembower (1911) collected syrphids on flowers of sweet scented water lily (*Nymphaea odorata* L.), large yellow water lily (*Nuphar advena* [Ait.]), American water lotus (*Nelumbo lutea* [Willd.]), swamp rose (*Rosa carolina* L.), buttonbush (*Cephalanthus occidentalis* L.), Canada thistle (*Cirsium arvense* [L.]), clasping leaved dogbane (*Apocynum sibiricum* Jacq.), trumpet creeper (*Campsis radicans* [L.]), wild bergamot (*Monarda fistulosa* L.), and pickerel weed (*Pontederia cordata* L.). Hamilton (1890) recorded that *Eristalis tenax* (L.) was primarily responsible for the pollination of chrysanthemums in greenhouses. Metcalf (1913) wrote that adults of *Mesograpta polita* (Say), *Eristalis vinetorum* (Fab.) and *Baccha fuscipennis* Say were observed by Ashmead feeding on the pollen of cotton blossoms. Several authors have recorded *Mesograpta polita* (Say) adults, as well as their larvae, feeding on pollen of corn. Robertson (1921) reported collection of *Xylota chalybea* Wd. on flowers of *Hydrophyllum appendiculatum* Michx., *Viburnum rafinesquianum* Schultes, *Rosa carolina* L. and *Rosa setigera* Michx. Some authors had written previously that *Xylota chalybea* Wd. does not visit flowers.

Metcalf (1913) wrote that he found it worth while when collecting to visit flowers of the common milkweed (*Asclepias* sp.). Large numbers of the weaker bodied syrphids become permanently trapped by the pollinia of the milkweed flowers. It is usually the legs of the flies which become entangled. Metcalf wrote that he had found as many as twenty individuals trapped on a single flower cluster. Osburn (1920) described in detail the manner in which flowers of dogbane (*Apocynum androsaemi-*

folium L.) trapped hundreds of *Mesograpta marginata* (Say), catching these small syrphids by their proboscises.

The value of a flowering plant as a host for syrphids generally depends largely on its location. One of the best situations is a wild plum thicket or an isolated pear tree near the edge of woods, exposed to open sunlight but protected from high winds. Another excellent collecting spot is at flowers of cowbane in an acid bog. At such a bog, Cranberry Glades, West Virginia, I took 85 species in a total of five days of collecting.

OTHER PLACES TO COLLECT SYRPHIDAE

Some species of Syrphidae may be collected best at places where the females oviposit, hence a knowledge of the larval types and larval habitats is important if one is to be a good collector. Aphidophagous species can be taken about most crops, orchards, weeds, and other places where aphid colonies occur. These include many species of *Mesograpta, Sphaerophoria, Syrphus, Didea, Baccha, Pipiza, Paragus, Melanostoma* and *Platycheirus.* Some syrphids oviposit in sap flowing from injured or diseased trees, including many species of *Polybiomyia, Cerioides, Tenthredomyia, Xylota, Brachyopa, Myiolepta, Eumyiolepta, Chrysotoxum* and *Ferdinandea.* Other syrphids oviposit in rotting logs, or in decaying places in trees, including many species of *Mallota, Spilomyia, Sphecomyia, Brachypalpus, Myiolepta, Chrysotoxum, Xylota* and *Temnostoma.*

Myrmecophilous syrphids of the genus *Microdon* are usually found not far from the nests of ants in which their larvae develop. They are weak fliers, flying near the ground and sunning themselves upon leaves or in long grass, especially along creek bottoms and in swamps and bogs. *Melanostoma* and *Platycheirus* are found most frequently near swamps, streams, or moist places. Many species, especially *Pipiza,* occur in large numbers hovering in the air where rays of sunlight shine through openings in moist woods. Many species of *Pipiza, Cheilosia, Temnostoma* and *Xylota* rest on sunny leaves, especially along creek bottoms. Some species of *Volucella* and *Ornidia,* notably *Volucella barei* Curran and *Ornidia obesa* (Fab.), characteristically rest on the underside of leaves. Species of *Eristalis* and *Helophilus,* whose larvae develop in polluted liquid or semiliquid media, often occur in fair numbers along the margins of quiet streams and pools, resting on rocks and low hanging foliage. *Baccha* are most commonly taken hovering in the air, only now

and then resting lightly upon a sunny leaf or flower, and often are difficult to detect.

Many species of syrphids can be collected at windows behind which they become trapped. I have found this the best place to collect the robust *Mallota* during late spring and summer. Hull (1948) listed 18 species of syrphids which he collected in Mississippi on windows.

Few syrphids are attracted to lights at night. A notable exception to this, however, is *Volucella vesicularia* Curran. All of the specimens of this species which I have taken were attracted to lights, and several other authors have recorded similar collections. *Volucella vesicularia* Curran is of special interest for another reason—it completely lacks the spurious vein which is characteristic of the Syrphidae.

CONCLUSIONS

The places to collect Syrphidae which are discussed here are by no means the only good places. Syrphids can be found in almost any locality and in widely diversified habitats. Most of them feed at flowers, incidentally serving as important agents in the pollination of those plants. Only a few of the flowering plants which have provided good syrphid collecting are mentioned, for syrphids feed on a greater variety of flowers than do honey bees. The syrphid collector should find many syrphids on the flowers of the plants discussed, but he should investigate other flowers, visit many habitats, and collect at different seasons in the same places. He should remember that many species of insects which are scarce some seasons or some years may be abundant in others.

LITERATURE CITED

Bembower, William. 1911. Pollination notes from the Cedar Point region. Ohio Nat. 11(8) : 378-383.

Curran, C. Howard. 1924. Contribution to a monograph of the Syrphidae (Diptera) from north of Mexico. Kans. Univ. Sci. Bul. 15(1) : 5-216.

Fernald, Merritt L., *et. al.* 1950. Gray's manual of botany. 8th (centennial) ed. American Book Company, New York. 1632 p., 1806 figs.

Hamilton, John. 1890. On the probable pollenization of greenhouse chrysanthemums by *Eristalis tenax*. Ent. Am. 6(5) : 81-83.

Hull, Frank M. 1948. The syrphid flies of Mississippi. Jour. Miss. Acad. Sci. 1941-47, p. 255-262.

Metcalf, Clell L. 1913. The Syrphidae of Ohio. Bul. Ohio Biol. Surv. 1: 9-123. Bul. Ohio St. Univ. 17(31): 1-123, 2 figs., 11 pl.

Osburn, Raymond C. 1920. The syrphid fly, *Mesogramma marginata* and the flower of *Apocynum*. Ohio Jour. Sci. 20(7): 261-266, 4 figs.

Phillips, E. F. 1933. Insects collected on apple blossoms in western New York. Jour. Ag. Res. 46(9): 851-862, 6 tab. Syrphidae, p. 855-857.

Robertson, Charles. 1921. Flower visits of *Xylota chalybea* Wd. (Diptera, Syrphidae). Ent. News 32(10): 314.

Small, John K. 1933. Manual of the southeastern flora. Science Press Printing Company, Lancaster, Pa. 1554 p., illus.

Williston, Samuel W. 1886. Synopsis of North American Syrphidae. Bul. U. S. Nat. Mus. 31: 1-336, 12 pl.

HOW TO KNOW THE SPIDERS. PICTURED-KEYS FOR DETERMING THE MORE COMMON SPIDERS, WITH SUGGESTIONS FOR COLLECTING AND STUDYING THEM by B. J. and Elizabeth Kaston. vi + 220 p., 552 figures. 1953. Wm. C. Brown Co., Dubuque. Price for spiral bound, paper covered copy $2.25, cloth bound $3.00.

The highly useful Pictured-Key Nature Series, edited by Dr. H. E. Jaques, has added the spider book to its growing list of publications. This most recent of the series by Dr. and Mrs. Kaston has been written with the intent of making it possible for anyone to identify many of the more common forms occurring in the United States. In all, the keys make it possible to identify 190 genera and 271 species of spiders.

There are sections on spider food, courtship, habitats, anatomy, and sexual differences, as well as on their habitats and additional references for the more serious student of the group. Characteristics useful for identification have been illustrated, and for each species there is a brief characterization and a statement about its habitat and distribution.

The figures are exceptionally well done and the use of the index as an illustrated glossary is an important aid and short cut for the novice. Employing photo-offset makes it possible to profusely illustrate a book in which illustrations are essential and yet sell it at a reasonable price.—L. B.

CORN EARWORM CONTROL WITH AIRPLANE APPLICATIONS OF 10 PERCENT DDT DUST

George P. Wene
Texas Agricultural Experiment Station, Weslaco, Texas

The effectiveness of corn earworm control obtained with DDT dusts varied according to the area in which the research work was undertaken. In California, Anderson and Haske (1949) obtained 72 percent worm-free ears with four applications of a 10 percent DDT dust applied at four day intervals. In New York, Butler and Carruth (1949) obtained good earworm control with three applications of 5 percent DDT, applied at two day intervals. In Pennsylvania, Rutschky (1951) showed good earworm control with 5 percent DDT applied at 2 to 3 day intervals. In Virginia, Greenwood and Hofmaster (1949) obtained good control with three applications of 3 percent DDT, applied at 3 to 4 day intervals. In Florida, Kelsheimer (1947) obtained excellent earworm control with a mixture of 3 percent DDT and 3 percent methoxychlor, applied three times at intervals of 3 to 4 days. However, Hayslip (1948), also in Florida, failed to obtain commercial earworm control with six applications of 5 percent DDT, applied at three day intervals. In Alabama, Eden (1953) failed to obtain earworm control with four applications of 10 percent DDT applied at three days intervals. In Texas, Wene and Blanchard (1950) using four applications of a 5 percent DDT dust, applied at three day intervals, failed to obtain earworm control. Since DDT dusts have given earworm control in certain areas, an intensified airplane dusting program was undertaken in three commercial sweet corn fields to determine whether the corn earworm *Heliothis armigera* (Hbn.) could be controlled with 10 percent DDT.

Materials and Methods.—Each of the three fields treated were 20 acres in size. Less than a quarter of a mile from the first two experiments were sweet corn fields of the same age which were being hand treated for earworm control. Six rows in each of these fields were left untreated as checks for the airplane dusted fields.

A 10 percent DDT dust was used in all three experiments. The DDT dust was applied at the rates shown in table 1. The dusting swaths were the width of the airplane's wing span. The airplane was flown at such a height that the wheels just

barely cleared the tops of the corn tassels. In most instances the DDT dust was applied at daily intervals although a number of times the wind velocity was over ten miles an hour, which is considered unfavorable for efficient airplane applications of insecticidal dusts.

TABLE 1.—DATES AND AMOUNT OF 10% DDT APPLIED BY AIRPLANE FOR CORN EARWORM CONTROL. 1953.

Application Number	Experiment 1		Experiment 2		Experiment 3	
	Date	Lbs. 10% DDT per Acre	Date	Lbs. 10% DDT per Acre	Date	Lbs. 10% DDT per Acre
1	4-9	30	4-18	40	5-1	35
2	4-10	25	4-19	35	5-2	35
3	4-11	35	4-20	20	5-3	20
4	4-12	25	4-21	40	5-4	35
5	4-13	35	4-22	30	5-6	20
6	4-14	35	4-24	40	5-7	20
7	4-15	25	4-26	25	5-8	20
8	4-16	35	4-27	40	5-9	35
9	4-17	35	4-28	30	5-11	35
10	4-18	35	4-29	30	5-13	35
11	4-20	20	4-30	25	5-14	35
12	4-21	27	5-2	25		
13	4-24	35	5-4	25		
worm-free ears in Dusted Field		92%		88%		52%
worm-free ears in adjacent untreated Field		8%		0%		—

Ten days before the sweet corn was harvested 50 ears were examined for earworm injury in the dusted fields and the untreated portions of the adjacent fields. Ears with live larvae in the silk channels were considered as injured, even though there was no damage on the ear itself. In each field, data were recorded on the percent of plants in silk at the time the dusting schedules were started. During the dusting period 50 ears were examined in the first two dusted fields for the presence of eggs and larvae in the silk masses.

DISCUSSION AND RESULTS.—In the first experiment the DDT applications were started when less than 1 percent of the plants were in silk. Seven days later all the plants were in silk, with

some dryness being noticed on the tips of many of the silk masses. At this time corn earworm eggs were found on 82 percent of the silks, while only 8 percent of the ears had live larvae. Dead first instar larvae were found in a number of the silk masses, indicating that control was obtained by killing the larvae instead of the adult. Five days later all the silks were dried back to the husks and no eggs were found. On April 28, two days before the sweet corn was harvested, an examination showed that 92 percent of the ears were worm-free whereas only 8 percent were worm-free in the untreated area in the adjacent field.

In the second field the dust applications were started when 5 percent of the plants were silking. Six days later the silks were examined for eggs and earworm larvae. Thirty-four percent of the silks were found to be infested with eggs and only 8 percent with live corn earworm larvae. These data indicate that daily dustings do not eliminate the corn earworm moth from a field. On May 4, an examination showed that 88 percent of the ears were worm-free in this dusted field while no worm-free ears were found in the adjacent untreated field.

The dust applications in the third field were started when approximately 10 percent of the plants were in silk. On May 20, fifty ears were examined for corn earworm injury. Fifty-two percent of these were worm-free. The lack of success in controlling the earworm may be due to two reasons: 1) the dust applications were started a little later; and 2) the data on poundage applied showed that four of the applications were only 20 pounds per acre.

SUMMARY.—The data show that the corn earworm can be controlled by repeated applications of a 10 percent DDT dust. For this area more research work is needed on timing, number, and rate of applications.

LITERATURE CITED

Anderson, Lauren D., and James W. Haske. 1949. Control of corn earworm on sweet corn in Southern California. Jour. Econ. Ent. 42(6): 933-941.

Butler, Jr., George D., and L. A. Carruth. 1949. Corn earworm control with DDT and other insecticides. Jour. Econ. Ent. 42(3): 457-461.

Eden, W. G. 1953. DDT for earworm control in sweet corn. Jour. Econ. Ent. 46(2): 359-360.

Greenwood, D. E., and R. N. Hofmaster. 1949. Corn earworm control studies in Virginia. Jour. Econ. Ent. 42(4): 675-677.

Hayslip, Norman C. 1948. Investigations on the control of the fall armyworm and the corn earworm attacking sweet corn and field corn in the Everglades area. Proc. Flor. State Hort. Soc. 1948: 168-173.

Kelsheimer, E. G. 1947. The use of some organic insecticides in the control of earworms attacking sweet corn. Proc. Flor. State Hort. Soc. 1947: 121-123.

Rutschky, Charles W. 1951. Corn earworm control experiments in Pennsylvania in 1950. Jour. Econ. Ent. 44(4): 567-569.

Wene, George P., and R. A. Blanchard. 1950. The use of insecticidal dusts in controlling the corn earworm. Jour. Econ. Ent. 43(1): 1-4.

HIGH JUNGLES AND LOW, by Archie Carr. xvi + 226, illustrated. University of Florida Press, Gainesville. 1953. Price $4.50.

Archie Carr, who is Professor of Biological Sciences at the University of Florida, has written a highly readable account of his experiences and observations during a stay of five years in Honduras and Nicaragua. The book is divided into four parts beginning with a description of the tropical cloud forests and their inhabitants. From the mountain tops, reaching toward the sky, he takes the reader next to the lowland forests. The "Wasting Land" is the subject of the third chapter in which Dr. Carr makes seven pertinent suggestions for improving relationships with the Latin-American countries.

Part II of the book provides some absorbing and entertaining anecdotes about the people of the country and his close relationships with them. In Part III, Dr. Carr moves again to the lowlands and tells of two lakes, Managua and Nicarugua, where there are several very interesting biological problems relating to the fishes occurring in them. The last section of the book takes the reader to the "Halls of the Mountain Cow" or tapir. This part tells of his adventures on a timber cruise through the virgin forests of Nicaragua.

Unfortunately proof readers missed a few typographical errors, the reproduction of photographs leaves something to be desired, and the price of this small book is excessive, nevertheless, the entertaining and informative reading and the vivid descriptions far more than offset these minor detractions.—L. B.

A PROPOSED REVISION OF THE CHECK-LIST OF FLORIDA LEPIDOPTERA

C. P. Kimball
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The only comprehensive check-list of the Lepidoptera of Florida was published in 1917 after the death of its compiler, J. A. Grossbeck (1917), and in some parts without his having completed the final draft of the manuscript. Because of this unsatisfactory state of affairs and because much collecting has been done in the state since that time, especially in areas then scarcely visited, the author, with the cooperation of entomologists of the University of Florida and other institutions, is contemplating the preparation and publication of a revised list.

To further this undertaking, information as to the location of pertinent material would be greatly appreciated. Anyone knowing the whereabouts of collections of Florida Lepidoptera, however meagre, is asked to please communicate such information to the author at the earliest convenient opportunity.

Up to the present time, the subjoined list of species, which were not mentioned by Grossbeck, have been recorded. The information has been gathered from various sources, but there remain many as yet unexplored or unknown. Additional records for the newly listed species are desired, and even more welcome would be the names and data for species not listed herein nor in Grossbeck.

This list should not be considered definitive, in as much as further study with longer series may very likely show some of the determinations to be in error.

Later, the author intends to publish a list of the species which have been recorded by Grossbeck as well as others which are in question, in an effort to establish on firmer grounds, their presence in or absence from the state.

The numbers are either those of the McDunnough check-list (1938-9), or the author's interpolations to indicate their approximate position in the systematic arrangement.

abbreviatana Wlshm., *Epiblema* 7047
abdominaria B. & McD., *Racheospila* 4032
abrupta Grt., *Raphia* 1140
abruptana Wlshm., *Epiblema* 7015
abomana Bsk., *Lorita* 7593.1
acerata Dyar, *Platytes* 5982

acheronta Fabr., *Historis* 332
acutangulalis Snell., *Blepharomastix* 5390
actuellus B. & McD., *Thaumatopsis* 5947
adamantana Gn., *Eucosma* 6876
adjutrix Cram., *Athyrma* 3593.2
aemulataria Wlk., *Philobia* 4665
agrippina subviridis Harv., *Catocala* 3328
albilinea Richards, *Metalectra* 3656.1
algidella Wlk., *Stenoma* 8585
americana Harr., *Acronicta* 1148
amorphella Clem., *Walshia* 7743
angulatalis Led., *Cataclysta* 5700.1
apicalis Gn., *Blepharomastix* 5388
apicimaculella Cham., *Tinea* 9646
arcifera Gn., *Paectes* 3233.1
argentilimitana Rob., *Phalonia* 7545
argentilineella Busck, *Euprora* 9415.1
argiolus pseudargiolus Bdv. & Lec., *Lycaenopsis* 475
associaria B. & McD., *Racheospila* 4033
athasiaria pellucidaria G. & R., *Lambdina* 5142
auranticella Grt., *Dioryctria* 6126

balanotes Meyr., *Oidaematophorus* 6569
baptisiae Forbes, *Erynnis* 547.1
barythyma Meyr., *Glyphidocera* 8351
belfragei Fish, *Pselnophorus* 6516
berryi Bell, *Atrytone* 639.1
biguttellus Forbes, *Crambus* 5886
bimaculana Rob., *Pharmacis* 7604
bimaculella Cham., *Tinea* 9648
binodulalis Zell., *Herculia* 5771
bipartitella Rag., *Peoria* 6438
bistriatella Hlst., *Pectinigeria* 6419
boisduvaliana F. & F., *Eurema* 68
bolliana Sling., *Gretchena* 7092
borkhauseni Zell., *Decantha* 8358
borregalis Dyar., *Parachma* 5804
bosqueella Cham., *Stegasta* 8148
brevidens Dognin, *Epiplema* 5226.1
brunneolineata Hlst., *Nematocampa* 5151
burserae Dyar, *Paectes* 3227
buscki B. & L., *Adaina* 6521

cacocnemos Jones, *Eurukuttarus* 9529
caduca Grt., *Neoerastria* 3127
caducus Dyar, *Menopsimus* 3728
californicus Wlshm., *Trichoptilus* 6461
caliginosellus Clem., *Crambus* 5925
canellus Forbes, *Loxocrambus* 5948
capitella Fabr., *Stegasta* 8148.1
capucinus Luc., *Asbolis* 683.1
carolina Jones, *Callosamia* 810.1
carolinensis B. & McD., *Pippona* 2954
caryae Grt., *Acrobasis* 6100
caryana Fitch, *Laspeyresia* 7280
catheretes Dyar, *Anegcephalesis* 6176
caudellella Dyar, *Megasis* 6261
cautella Wlk., *Ephestia* 6403
celibata Jones, *Eurukuttarus* 9528
cervina Sm., *Platysenta* 2623.1
circulana gemellana Heinr., *Eucosma* 6908
columella Zell., *Piesmopoda* 6122.1
concinnula Wlk., *Capnodes* 3607.1
conclusella Wlk., *Anacampsis* 8279
concubitana Heinr., *Gretchena* 7089
confusalis Wlk., *Cataclysta* 5701
confusis Bell, *Thorybes* 504
connecta Grt., *Acronicta* 1167
consors A. & S., *Catocala* 3313
contorta Gn., *Melipotis* 3550.1
corallina Wlshm., *Aristotelia* 7817.1
coronaria Stkr., *Schidax* 5226
costimaculalis Fern., *Pyrausta* 5631
coverdalella Kft., *Compsolechia* 8260
crambidoides Grt., *Diatraea* 5962
crameraria Gn., *Apicia* 5180.2
crataegella B. & McD., *Nephopteryx* 6164
critica Forbes, *Argyria* 5957.1
cubana Grt., *Heterocampa* 3893
cubana Warr., *Microgonia* 5214.1
cubanalis Hamp., *Azochis* 5447.1

defectalis Wlk., *Trichoptilus* 6460
delicatella Wlshm., *Cosmopteryx* 7683

densa Wlk., *Arzama* 2705
dentella Busck, *Chionodes* 7981
dentosa Grt., *Omphalocera* 5778
designalis Gn., *Agathodes* 5410
desotanum Heinr., *Gymnandrosoma* 7303
differentialis Dyar, *Blepharomastix* 5387.1
dimunitana Haw., *Ancylis* 7198
diplomachlalis Dyar, *Argyria* 5958.1
discoocellella Cham., *Chionodes* 8051
discretivana Heinr., *Epiblema* 7029
distincta Grt., *Cutina* 3464
dolli castaneum Beut., *Paranthrene* 8802

editrix Gn., *Anomis* 3622
elealis Wlk., *Sameodes* 5427
elegans Clem., *Crambus* 5889
erectifascia Dyar., *Monoleuca* 5242
eresimus tethys Forbes, *Danaus* 91
erigeronana Riley, *Pharmacis* 7605
esula Druce, *Catabena* 2741
eutalanta Dyar, *Eunystalea* 3856
evanescens Dyar, *Diatraea* 5961
exigua Hbn., *Laphygma* 2683

falcata Braun, *Perimede* 7722
fasciola H.-S., *Lithacodes* 5266
fasciolaris Hbn., *Melipotis* 3547
fernaldana Wlshm., *Cnephasia* 7460
flavicollis Wlshm., *Laspeyresia* 7291
floridana Zell., *Ancylis* 7193.1
floridata Grt., *Prochoerodes* 5212.1
floridella Dietz, *Valentinia* 8493
fractilinea Zell., *Valentinia* 8489
frustrana Comst., *Rhyacionia* 6752
fucosa Hbn., *Hypoprepia* 959
furfurana Haw., *Bactra* 6596

gallaegenitella Clem., *Epithectis* 7922
gallaerandialis Dyar, *Thyridopyralis* 5324
ganglio Hbn., *Athyrma* 3593.1
gemistrigulana Kft., *Petrova* 6762
glenni Clarke, *Dichomeris* 8299.1
gnophosaria Gn., *Semiothisa* 4738
goodelliana Fern., *Ancylis* 7199
gracea Dyar, *Lithacodes* 5267
gracilineata Gn., *Lygris* 4401.1
grata Fabr., *Euthisanotia* 2858
grossbecki B. & McD., *Mineola* 6116
grossbecki Heinr., *Epiblema* 7017

haemorrhaedalis Gn., *Anania* 5363.1
haitensis Skin., *Poanes* 631
hamulata Gn., *Syssaura* 5185
hebesana Wlk., *Endothenia* 6625
hecebolus Scud., *Panoquina* 678.1
henrici margaretae dosP., *Incisalia* 407
humilis Zell., *Stenoma* 8590
hydrillalis Gn., *Bleptina* 3802.1

illapsa Wlk., *Euagrotis* 1483
illustrata Gn., *Syngrapha* 3267.1
imitabilis Dyar, *Cataclysta* 5707
immaculata Cass., *Lagoa* 5289
immortua Grt., *Melaporphyria* 2916
impleta Wlk., *Acronicta* 1201
impulsalis H.-S., *Diaphania* 5420.1
incertella Zinck., *Eugrotea* 5845
incurva Sepp., *Athysania* 3600.1
indomita Wlk., *Melipotis* 3549
ingens Heinr., *Laspeyresia* 7296
insiticiana Zell., *Ecdytolopha* 7304
insueta Gn., *Leucania* 1992
intermedialis Wlk., *Herculia* 5766
intermicata Wlk., *Lychnosea* 5154
interpunctella Hbn., *Plodia* 6408
iridana B. & Bsk., *Platynota* 7365

januaris Gn., *Melipotis* 3549.2
julianalis Wlk., *Dicymolomia* 5347
junctilineana Wlshm., *Eucosma* 6974

kingi Cher. & Klots, *Strymon* 389.1

lactiflosella Cham., *Glyphidocera* 8342
latifascia Wlk., *Prodenia* 2680
latiferreanus Wlshm., *Mellisopus* 7300
liopasialis Dyar, *Pyrausta* 5637
lorina Druce, *Lois* 3557.1
louisiana Forbes, *Xylormisa* 3777
lycopersicella Busck., *Keiferia* 8215
lygdamis Druce, *Eurrhyparodes* 5364
lyside Godt., *Kricogonia* 63

maclurae Riley, *Sericoplaga* 5497
maculimarginella Clem., *Chionodes* 8080
maerula Fabs., *Anteos* 56.1
magnificalis Hbn., *Cataclysta* 5699
malachitana Zell., *Eumarozia* 6634
mandarinella Dietz, *Tinea* 9669
manueli Bell & Comst., *Polygonus* 481.1
margharita Cass., *Sterrha* 4189.1
margoriella Dietz, *Amhydria* 9599
mediostriatella Clem., *Isocorypha* 9819
melanospila Gn., *Raparna* 3662
miamialis Dyar, *Sylepta* 5405
minima Edw., *Copaeodes* 574
minimalis B. & McD., *Bleptina* 3802
minimella Rob., *Raphiptera* 5849
ministra Dru., *Datana* 3829
minusculalis Moesch., *Epitamyra* 5787.1
molesta Busck, *Grapholitha* 7242
moniligeralis Led., *Cataclysta* 5698.1
mopsalis Wlk., *Sameodes* 5429
mucidellum Rag., *Homoeosoma* 6370
muzaria Wlk., *Euchlaena* 4995.1
myricella B. & McD., *Acrobasis* 6105

neamathla Skin. & Wms., *Lerodea* 672
nebula B. & McD., *Ozarba* 3087
neda Latr., *Eurema* 72.1
nigratomella Clem., *Duvita* 8258
nilotica nigrimacula Warr., *Characoma* 3234
niphon Hbn., *Incisalia* 413
niveiguttana Grt., *Phaecasiophora* 6656

obsoleta Grt., *Argyrostrotis* 3456
obtusaria Hbn., *Euchlaena* 4995
obvertens Wlk., *Massala* 3533
ochrifrontella Zell., *Euzophera* 6318
offectalis Hlst., *Eucosma* 6861
ostrinella Clem., *Moodna* 6396
otiosana Clem., *Epiblema* 7044

palmetum Heinr., *Laspeyresia* 7274
palpigera Wlk., *Brachyacma* 8289.1
panalope Dyar, *Platytes* 5983
parva Wlshm., *Stenoptilia* 6506
parvella Dyar, *Ollia* 6426
parvula H.-S., *Lacinipolia* 1747
paularia Moesch., *Chlorochlamys* 4092.1
pectinalaeella Cham., *Glauce* 7859
peosinata Gn., *Microgonia* 5214.2
pereyra Clarke, *Chionodes* 8000.1
perpendicularis Gn., *Melipotis* 3546.1
phidilealis Wlk., *Hellula* 5424
philea Joh., *Phoebis* 58
phragmitella Staint., *Lymnaecia* 7744
phtisialis Wlk., *Mursa* 3658.2
plebiana Zell., *Crocidosema* 7101
plejadellus Zinck., *Chilo* 5976
plusialis H.-S., *Argyractis* 5698
porrectalis Gn., *Anepischetos* 3704.2
porrectella Linn., *Plutella* 8870
praefectellus Zinck., *Crambus* 5863
priapeia Heinr., *Bactra* 6599
prolata Wlk., *Melipotis* 3551.1
psychialis Hlst., *Glaphyria* 5328
pulverosalis Wlk., *Gabara* 3633
pumilio Zell., *Marasmarcha* 6504
punctidiscanum Dyar, *Gynandrosoma* 7302
pura B. & McD., *Crambidia* 912
purissima Dyar, *Boryzops* 3584
pygmaeella Rag., *Pinipestis* 6136
pyloalis Wlk., *Glyphodes* 5412
pyraustalis Dyar, *Tholeria* 5516

quaintancella Dietz., *Valentinia* 8490
quercifoliana Fitch, *Argyrotaenia* 7452
quinella Zell., *Fascista* 7972

raracana Kft., *Thiodia* 6786
reconditalis Wlk., *Diathrausta* 5719
rectilinea latomia Harv., *Limacodes* 5263
repandis Schaus, *Desmia* 5356.1
repleta Wlk., *Feltia* 1450.1
rhoifoliella Cham., *Gracilaria* 9379
rigidana Fern., *Rhyacionia* 6751
rileyi Dietz, *Tinea* 9672
rileyi Wlshm., *Pyroderces* 7723
robinsonana Grt., *Eucosma* 6865

roseosuffusella Clem., *Aristotelia* 7834
rotundalis Wlk., *Epizeuxis* 3737
rubedinellus Zell., *Elasmopalpus* 6231.1
rubicunda Fabr., *Anisota* 848
rubripennis G. & R., *Faronta* 1961
rufimargo Hbn., *Panopoda* 3534

sacculalis Rag., *Penthesilea* 5810
schistisemalis Hamp., *Lamprosema* 5384.1
scudderiana Clem., *Epiblema* 7027
sejuncta Heinr., *Rupela* 5823
seriatana Zell., *Phalonia* 7537
serpentella Kft., *Prionapteryx* 5844
serrativitella Zell., *Trichotaphe* 8315
serrulata Pack., *Cosymbia* 4212
silicalis Gn., *Sylepta* 5400
simpliciella Busck, *Trichotaphe* 8317
slossonata McD., *Eupithecia* 4287.1
slossoni Hlst., *Tetralopha* 6033
smithi Haim., *Zale* 3475
speciosissima G. & R., *Papaipema* 2482
stellella Busck, *Mompha* 7749
striatella Murt., *Gnorimoschema* 8211
strigata Sm., *Gabara* 3635
subaustralis Hlst., *Epimecis* 4951.1
subolivaceana Wlshm., *Phalonia* 7560.1
subrufa Warr., *Mursa* 3658.1
sunia Gn., *Prodenia* 2681.1

tantilla Heinr., *Satronia* 7232
tenuifascia Harv., *Cisthene* 934
texana Rob., *Ommatopteryx* 5952
thyrsisalis Wlk., *Macalla* 6013
titan Cram., *Sesia* 765
tortricina Zell., *Tarachidia* 3170
trialbamaculella Cham., *Aroga* 7965
trinotella Busck, *Trichotaphe* 8328
tripsacus Dyar, *Crambus* 5932
tripuncta H.-S., *Lerodea* 675
tripunctata Dyar., *Crambus* 5932.1
trisectus Wlk., *Crambus* 5919
tura Druce, *Phuphena* 2545.1
tytiusalis Wlk., *Syngamia* 5393.1

unicornis A. & S., *Schizura* 3924
uranides Dyar., *Xantippe* 5801
uxorialis Dyar, *Schoenobius* 5834

verniochreana Heinr., *Thiodia* 6855
vestaliana Zell., *Hystricophora* 7217
vibex Geyer, *Polites* 620
vinovinctalis Hamp., *Phlyctaenia* 5548.1
vinulentaria G. & R., *Euchlaena* 5000

walsinghami Bsk., *Tineola* 9695.1
walsinghami Kft., *Epiblema* 7035

zeellus Fern., *Crambus* 5927
zonulata Hlst., *Microgonia* 5213
zophodactyla Dup., *Stenoptilia* 6508

LITERATURE CITED

Grossbeck, J. A. (ed. by F. E. Watson). 1917. Article I, Insects of Florida. IV. Lepidoptera. Bull. Amer. Mus. Nat. Hist. Vol. 37, pp. 1-147.

McDunnough, J. 1938-39. Check list of the Lepidoptera of Canada and the United States of America. Mem. Southern California Acad. Sci. Vol. 1, pp. 1-275. Vol. 2, pp. 1-171.

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A NEW SPECIES OF TREPOBATES UHLER FROM FLORIDA (HEMIPTERA: GERRIDAE)

C. J. Drake [1] and H. C. Chapman [2]

Uhler (1894) proposed the name *Trepobates* for the preoccupied generic name *Stephania,* erected by Buchanan-White (1893) for the reception of the fresh water halobatinid described as *Halobates pictus* Herrich-Schaeffer (1848) from North America. The genus *Trepobates* Uhler is now represented in the Western Hemisphere by 11 described species, including the new form characterized herein from Florida and Mississippi. The genus *Kallistometra,* founded by Kirkaldy (1899) for the West Indian *K. taylori,* has been correctly synonymized with *Tropobates.* As pointed out elsewhere, *taylori* is a valid species of *Trepobates,* and *T. comitialis* Drake and Harris is synonymous with *taylori.* In order to clear up synonymy and general distribution, a list of species is appended at the end of the description of the new species.

As most of the species of *Trepobates* are about the same size and form, resemble somewhat one another in color and markings, and inhabit rather similar types of habitats in secluded haunts of both standing and running waters, the species have always been much confused in collections and literature. For several decades, a complex of eight or nine specimens were confounded in the literature with *T. pictus* (Herrich-Schaeffer). References to *T. pictus* often include two or three different species, and sometimes the true *pictus* is not even represented in the complex.

Esaki (1926) sorted out two valid species from the "*pictus*" complex and described them as *T. inermis* and *T. subnitidus.* These two species are now recognized as the commonest and most widely dispersed forms in the United States. In a paper six years later, Drake and Harris (1932) described more new species from the *pictus* complex, but failed to discriminate between *inermis* and *subnitidus,* and suggested a study of the male genitalia. Deay and Gould (1936) made the same errors as Drake and Harris, and besides they wrongly treated the true *inermis* as *T. knighti* Drake and Harris. To some extent, the above con-

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fusion may be ascribed to the fact that Esaki (1926) failed to observe the extremely long hairs on the basal part of the inferior side of the third antennal segment in the male antennae of *inermis*. These inordinately long hairs are distinctive characteristics of the males in both *inermis* and *knighti*. According to Dr. R. I. Sailer, a male *T. inermis* from Washington, D. C. (det. Esaki), in the U. S. National Museum, bears the long antennal hairs as described above.

Trepobates subnitidus Esaki

Trepobates subnitidus Esaki, Ann. Mus. Nat. Hung., 23: 141-142, 3 figs. 1926.

Trepobates subnitidus Drake and Harris, Bull. Brook. Ent. Soc., 27: 119. 1932.

Trepobates inermis Drake and Harris, Bull. Brook. Ent. Soc., 27: 119-120. 1932.

Trepobates inermis Deay and Gould, Am. Mid. Nat., 17(4): 767-768, 1 fig. 1936.

Trepobates subnitidus Deay and Gould, Am. Mid. Nat., 17(4): 768. 1936.

In this species the second antennal segment is nearly as long or subequal to the third; third and fourth equal in length. In the male the third antennal segment is without extremely long hairs; the genital segments bear only inconspicuous pubescence. The underside of the middle femora and base of tibiae in male are fringed with the usual long hairs. In both *inermis* and *subnitidus*, the femoral hairs are about as long as the diameter of the segment. The original description of *subnitidus* is accompanied by figures of the antenna and body of the apterous female. *Subnitidus* is widely disseminated in the United States east of the Rocky Mountains, and especially abundant in the Mississippi Valley States.

Trepobates inermis Esaki

Trepobates inermis Esaki, Ann. Mus. Nat. Hung., 23: 140-141, 4 figs. 1926.
Trepobates knighti Deay and Gould, Am. Mid. Nat., 17(4): 768. 1936.

The original description of this prominently striped species is also accompanied by good illustrations. The second antennal segment in both sexes is distinctly shorter than the third, the third and fourth are subequal. The connexiva in the females of both *inermis* and *subnitidus* are not produced behind. The specimens described by Deay and Gould (1936) as *T. knighti* Drake and Harris are typical examples of the true *inermis*. In the males of both *inermis* and *knighti*, the basal part of the inferior

side of the third antennal segment is furnished with extremely long hairs; sometimes, these long hairs lie flat against the surface of the underside of the segment, and then are a little difficult to observe. The underside of the first genital segment in the male *knighti* is clothed with moderately long, conspicuous, brownish hairs (hairs much shorter than in *T. trepidus* Drake and Harris), whereas *inermis* these hairs are very short, sparse and inconspicuous. The connexiva in the female *knighti* terminate apically in long upright processes. These processes are much longer in *knighti* than in *becki*. *Subnitidus* is a darker species than *inermis* with small pale markings. *Inermis* is widely disseminated east of the Rocky Mountains, and apparently most abundant in the Eastern States.

Trepobates citatus, n. sp.

APTEROUS FORM: Large, moderately robust, entire black or black with an orange spot on each side of median line (near hind margin) of pronotum, sometimes also a small spot on each side near the middle and a narrow marginal stripe on hind margin of mesonotum brownish or orange-brown; mesopleura with the broad longitudinal stripe on each side quite bluish; entire body beneath yellowish brown. Antennae black with the base narrowly brownish. Legs quite blackish with coxae somewhat brownish. Head usually with a transverse basal brownish stripe. Anterior femora dark at apex, without apical constriction. Entire dorsal surface sometimes wholely black, without pale markings. Female stouter than male. Winged form unknown.

Third antennal segment in male without long hairs; second segment shortest in both sexes. Length of antennal segments (80 units equal 1 millimeter)—I, 80 (male) and 72 (female); II, 40; III, 44; IV, 45. Rostrum extending on basal part of mesosternum.

Width of head across eyes, 1.00-1.05 mm. subequal to the length of the first antennal segment. Pronotum short, about half as long as the mesonotum, the latter truncate behind. Legs long, slender, black, without pale markings, except at base of anterior femora. Middle femora of male densely fringed on underside (a fringe along both front and hind margins) with moderately long hairs, the length of the individual hairs scarcely more than one-half of the diameter of the femora at the respective points of origin of the hairs; femora much shorter than tibiae (70:40). Abdomen entirely black above. Male with last ventrite as long as the two preceding segments; genital segments tapering posteriorly, shortly pubescent, without long hairs, the first segment nearly twice as long as the second. Male parameres short, stout, curved. Female distinctly broader than the male; abdomen above usually with a basal patch of rather long dark hairs; outer margins of fourth, fifth and sixth connexival segments beset with some short bristly hairs; connexiva not produced behind; posterior margin of mesonotum without posterior process, truncate.

Length, 4.24-4.45 mm.; width, 1.50 mm. (male) and 1.80 mm. (female). *Type* (male) and *allotype* (female), Ocala, Fla., April 14, 1950, Dr. D. E.

Beck, in Drake Collection. Paratypes, 2 specimens taken with type; many specimens, Apopka, (Wekiwa Springs), Fla., June-December, 1952, H. C. Chapman; and 2 examples Pascagoula, Miss., July, 1921. Paratypes in the collections of U. S. National Museum, Brigham Young University, and the authors.

Separated from *T. subnitidus* and *inermis* by the much darker color, antennal formula, much shorter hairs in the fringes on the inferior side of male femora, and more robust form.

LIST OF SPECIES

Genus *Trepobates* Uhler, 1894
Kallistometra Kirkaldy, 1899
Stephania Buchanan-White, 1893
Type, *Halobates pictus* Herrich-Schaeffer, 1884

1. *becki* Drake and Harris, 1932.....Ariz., N. Mex., Mex. (Chihuahua)
2. *citatus* Drake and Chapman, 1953.....Fla., Miss.
3. *floridensis* Drake and Harris, 1928.....Fla.
4. *inermis* Esaki, 1926.....U. S. (East of Rocky Mts.)
   knighti Deay and Gould, 1936
5. *knighti* Drake and Harris, 1928.....Mo., Ia., Ill., Ind., Okla., Ark.
6. *panamensis* Drake and Hottes, 1952.....Mex., Pan.
7. *pictus* (Herrich-Schaeffer), 1848.....U. S. (East of Rocky Mts.), W. I.
8. *subnitidus* Esaki, 1926.....U. S. (East of Rocky Mts.)
   inermis Drake and Harris, 1932
   inermis Deay and Gould, 1936
9. *taylori* (Kirkaldy), 1899.....W. I., Centr. Am., Peru, Col., Venez., Mex., U. S. (Ariz., N. Mex., Tex.)
   comitialis Drake and Harris, 1928
   pictus Uhler, 1894
10. *trepidus* Drake and Harris, 1932.....Mex., Centr.-Amer., W. I., Col., Venez., U. S. (Ariz., N. Mex.)
11. *vazquezae* Drake and Hottes, 1952.....Mex. (Guerrero)

THREE NEW SPECIES OF ARCHIPSOCUS FROM FLORIDA (PSOCOPTERA: ARCHIPSOCIDAE)

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While studying the taxonomy and life histories of representatives of the genus *Archipsocus* in north-peninsular Florida, I have found five species in the region, three of which are new to science and are described below. *A. panama* Gurney is recorded in North America for the first time, and *A. nomas* Gurney is recorded from several localities throughout Florida.

Archipsocus is a group of psocids differing from each other in minute characters. No single structure may be used to diagnose all of the species. Badonnel (1948) has listed characters useful for this purpose, but some of these present special problems not discussed by that author. For example, the relationship between lengths of antennal segments, be it expressed as a diagram or a ratio, depends to a certain extent on the way in which measurements are made. The pedicel has an emarginate apex and its lengths to the tips and to the center of the emargination differ enough to cause very different relations to lengths of the other segments. In my specimens, I have measured to the center of the emargination. The sculpture of the prothoracic epipleura is so difficult to investigate that I have not used it in my descriptions, although Badonnel included it in his.

In addition to the characters listed by Badonnel, I find that details of shape of the phallic frame, though subject to some variation, are of much value in diagnosing species. The shape of the head viewed from above (figs. 5 and 6) separates *A. panama* from the other Florida species of its subgenus. Some characters other than those of adult morphology are of use in distinguishing species. These include mode of oviposition, color of eggs, and habitat. The names for the two species groups proposed by Badonnel (1948, p. 294, footnote) are used here with subgeneric rank. My application of these names, following Badonnel's supposition, is hypothetical, for it is not known to which group the genotype should be assigned. The Florida species may be separated by the following keys:

I. Key to Subgenera

1. Males of Florida form completely apterous. Discoid sensillae of flagellar segments 6 and 10 each with a very small central cone.

Females viviparous and lacking gonapophyses.....*Archipsocopsis* (*A. parvulus* n. sp.)

1′. Males with short wing pads. Discoid sensillae of flagellar segments 6 and 10 each with a central filament. Females oviparous and possessing gonapophyses.....*Archipsocus*

II. KEY TO SPECIES OF SUBGENUS *Archipsocus*

A. Males

1. Aedeagal arch thickened (fig. 10); parameres not converging anteriorly. Abdominal segment 8 completely sclerotized except for a narrow, dorsal, median strip.....*A. panama* Gurney

1′. Aedeagal arch thinner than parameres anterior to it (figs. 7, 8, 9); parameres converging or fused anteriorly. Abdominal tergite 8 completely membranous.....2

2. Membranous portions of abdomen pale brown; hairs long, grizzly. Aedeagal arch (fig. 9) with relatively wide bases....*A. nomas* Gurney
2′. Membranous portions of abdomen decidedly dark red-brown or brick red; hairs shorter, not grizzly. Aedeagal arch with relatively narrow bases (figs. 7 and 8).....3

3. Membranous portions of abdomen dark red-brown. Aedeagal arch semi-circular in shape (fig. 7). Colonies found on tree trunks, branches, and walls.....*A. floridanus* n. sp.

3′. Membranous portions of abdomen lighter, brick red. Aedeagal arch obtuse-angular in shape (fig. 8). Colonies found mostly on palm leaves.....*A. gurneyi* n. sp.

B. Females

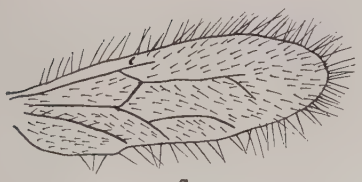
1. Head markedly rhomboidal in shape (fig. 6). Antennal segment $f_1 > p$ (measured to center of emarginate tip). Colonies usually small, on branches and vines.....*A. panama* Gurney
1′. Head not markedly rhomboidal in shape (fig. 5). Antennal segment $f_1 < p$. Colonies attaining large size.....2

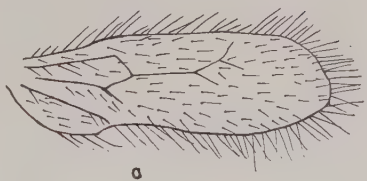
2. Membranous portions of abdomen pale brown (becoming somewhat darker in alcohol). Micropterous form with relatively long wing pads (ratio of body length to forewing-pad length <6). Ventral valve with acuminate tip.....*A. nomas* Gurney

2′. Membranous portions of abdomen brick red or dark red-brown. Micropterous form with relatively short wing pads (ratio of body length to forewing-pad length > 7.5). Ventral valve with acute or rounded tip.....3

3. Membranous portions of abdomen dark red-brown. 13 to 17 cilia on margin of external valve. Pigmented area of subgenital plate shaped as in fig. 11. Colonies on tree trunks and branches.
A. floridanus n. sp.

3′. Membranous portions of abdomen brick red. 10 to 14 cilia on margin of external valve. Pigmented area of subgenital plate shaped as in fig. 14. Colonies usually on palm leaves
A. gurneyi n. sp.





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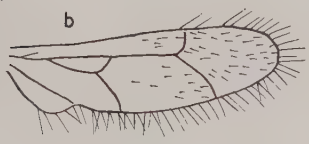

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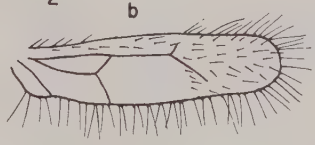

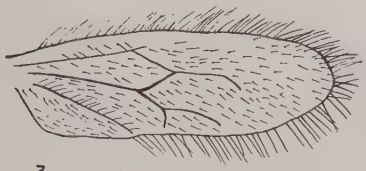

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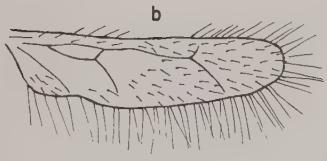

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Figure 1. *Archipsocus floridanus*, n. sp., macropterous ♀, a. forewing, b. hindwing.
Figure 2. *Archipsocus parvulus*, n. sp., macropterous ♀, a. forewing, b. hindwing.
Figure 3. *Archipsocus gurneyi*, n. sp., macropterous ♀, a. forewing, b. hindwing.
Figure 4. *Archipsocus parvulus*, n. sp., ♂, phallic frame.
Figure 5. *Archipsocus floridanus*, n. sp., ♀ outline of head, dorsal view.
Figure 6. *Archipsocus panama* Gurney, ♀, outline of head, dorsal view.

TABLE I.—RATIO OF MEAN LENGTHS OF ANTENNAL SEGMENTS OF FLORIDA ARCHIPSOCUS SPECIES (FEMALES ONLY).

	A. panama (ex Panama)	*A. panama* (ex Florida)	*A. gurneyi*	*A. floridanus*	*A. parvulus*
No. Specimens	3	4	2	3	2
Sc	1.00	1.00	1.00	1.00	1.00
P	2.15	2.00	2.08	1.86	2.11
F_1	2.35	2.38	1.79	1.56	2.63
F_2	1.42	1.62	0.85	0.81	1.16
F_3	1.69	1.69	1.03	0.86	1.37
F_4	1.85	1.72	1.00	0.97	1.63
F_5	1.27	1.17	0.95	0.97	1.47
F_6	1.69	1.45	0.95	1.03	1.53
F_7	1.12	1.10	0.95	0.92	1.47
F_8	1.46	1.55	0.95	0.92	1.37
F_9	1.09	1.10	0.87	0.89	1.37
F_{10}	1.35	1.55	0.87	0.86	1.26
F_{11}	2.15	2.38	1.67	1.75	2.79

Archipsocus (Archipsocus) floridanus, n. sp.

DIAGNOSIS: differs from *A. gurneyi,* n. sp., *A. nomas* Gurney, and *A. panama* Gurney by the characters in the key. Differs from *A. ghesquierei* Bad. (1946) of Belgian Congo in shape of phallic frame, coloration, and lack of conspicuous hairs on basal veins of forewings. Differs from *A. neens* End. (Bad., 1948, 1949) of West Africa in coloration, especially pattern of abdomen, proportions of antennal segment lengths, especially $f_1 < p$, shape of phallic frame, and ciliation of paraproct. Differs from *A. textor* End. (1911) of East Africa in color and extent of development of forewing venation in macropterous form. Not compared with *A. recens* End., and *A. brasilianus* End.

HOLOTYPE FEMALE: MACROPTEROUS

Measurements: total body length 1.19 mm.; forewing length 1.16 mm.; antennal length 0.52 mm.; hind leg: femur + trochanter 0.32 mm., tibia 0.38 mm.

Morphology (from paratypes and holotype): Antennae: f_1 with a median and an apical discoid sensilla, both lacking filaments. Discoid sensilla of f_4 about two-thirds distance from base of segment, lacking

Figure 7. *Archipsocus floridanus,* n. sp., ♂, phallic frame.
Figure 8. *Archipsocus gurneyi,* n. sp., ♂, phallic frame.
Figure 9. *Archipsocus nomas* Gurney, ♂, phallic frame.
Figure 10. *Archipsocus panama* Gurney, ♂, phallic frame.

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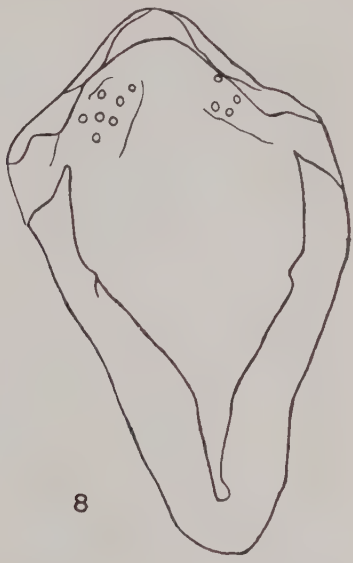

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filament. F_{II} and f_{10} each with a single subapical discoid sensilla bearing a filament. Antennal ratio (tab. I) similar in all respects to that of *A. ghesquierei* Bad. Ocelli well developed on macropterous forms, represented by two inconspicuous, pale spots on micropterous females. Tip of lacinia (fig. 13) bearing two short prongs subequal in length. Laterocervical sclerite (fig. 24) bearing three to six small cilia on its dorsal border. Membrane of forewing ciliated evenly with hairs somewhat shorter than those of margin. Membrane of hindwing ciliated on apical two-thirds with short hairs. First abdominal segment mostly sclerotized dorsally, the sclerotized area pigmented in the cuticle. Subgenital plate with a central marginal thickening bearing hairs. Pigmented area of subgenital plate (fig. 11) with edges of anterior emargination rounded. External valves bearing 13 to 17 marginal cilia. Ventral valves curved, with rounded or acute tips perhaps depending on angle of observation.

Color: head, thorax, and terminal abdominal segments dark brown, somewhat paler on pro- and metanota. Femora concolorous with pronota; tibiae and tarsi paler. Antennae concolorous with tibiae. Membranous portions of abdomen red-brown (pigment subcuticular), appearing granular due to overlay of brown culticular spots at bases of hairs.

ALLOTYPE MALE: MICROPTEROUS

Measurments: total body length 1.18 mm.; forewing length 0.15 mm.; antennal length 0.45 mm.; hind leg: femur + trochanter 0.28 mm., tibia 0.32 mm.

Differs from holotype in microptery. Phallic frame (fig. 7 of paratype) with rounded aedeagal arch.

VARIATION: micropterous females occur with forewings averaging 0.17 mm. in length, hindwings less than half that length. Two brachyterous females have been found with forewings measuring 0.36 and 0.39 mm. One macropterous female exhibited a complete pterostigma in one wing and a loop-type areola postica in the other.

TYPE LOCALITY: Florida: Alachua County: University of Florida Campus. Holotype and allotype taken July 17, 1953. Paratypes: 45 ♂♂, 40 micropterous ♀♀, 2 brachypterous ♀♀, 70 micropterous ♀♀ collected from February to October at the following Florida localities: Alachua County: University of Florida Campus, Lake Alice, Newnan's Lake, Hogtown Creek and U. S. Highway no. 26; Highlands County: Highlands

Figures 11 through 13. *Archipsocus floridanus*, n. sp., ♀: 11. pigmented area of subgenital plate, 12. gonapophyses, 13. lacinia tip.

Figures 14 through 16. *Archipsocus gurneyi*, n. sp., ♀: 14. pigmented area of subgenital plate, 15. gonapophyses, 16. lacinia tip.

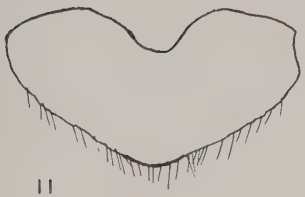
Figure 17. *Archipsocus parvulus*, n. sp., ♀, pigmented area of subgenital plate.

Figure 18. *Archipsocus parvulus*, n. sp., ♀, lacinia tips, a. and b., left and right tips of same specimen.

Figure 19. *Archipsocus floridanus*, n. sp., ♀, a. and b. apices of ventral valves of gonapophyses.

Figure 20. *Archipsocus gurneyi*, n. sp., ♀, apex of ventral valve of gonapophyses.

Figure 21. *Archipsocus nomas* Gurney, ♀, apex of ventral valve of gonapophyses.



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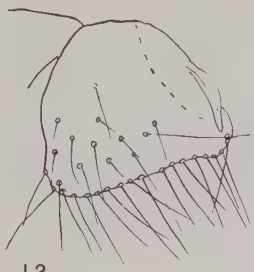

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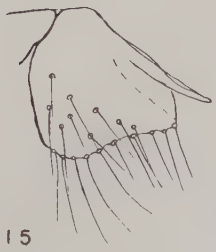

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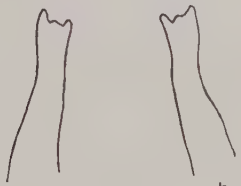

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Hammock State Park; Levy County: Waccasassa River and Florida Highway no. 24; Sarasota County: Myakka River State Park.

DISPOSITION OF TYPES: the holotype, allotype and two pairs of paratypes in the U. S. National Museum; two pairs of paratypes in the Florida State Museum at Gainesville. A pair of paratypes in each of the following private collections: K. M. Sommerman, Orlando, Florida; J. V. Pearman, Aston Clinton, England; A. Badonnel, Paris, France. The remaining paratypes will be retained in my collection.

Archipsocus (Archipsocus) gurneyi, n. sp.

DIAGNOSIS: differs from *A. floridanus*, *A. panama*, and *A. nomas* by the characters given in the key. Differs from *A. ghesquierei* Bad. in coloration, lacking dark brown rings on abdomen; shape of phallic frame, details of length proportions of antennal segments, and lack of conspicuous hairs on basal veins of forewings. Differs from *A. neens* End. in coloration, shape of lacinia tip, number of hairs on margin of ventral valve, ciliation of ♀ paraproct, and proportions of antennal segment lengths, especially $f_1 < p$. Differs from A. *textor* End. in color and extent of development of forewing venation in macropterous form. Not compared with *A. recens* End., and *A. brasilianus* End.

HOLOTYPE FEMALE: MACROPTEROUS

Measurements: total body length 1.54 mm.; forewing length 1.22 mm.; antennal length 0.53 mm.; hind leg: femur + trochanter 0.41 mm., tibia 0.46 mm.

Morphology (from paratypes and holotype): antenna: f_1 with two discoid sensillae, one median, the other sub-apical, both lacking filaments; f_4 with a single subapical discoid sensilla lacking a filament; f_9 and f_{10} each with a single subapical discoid sensilla bearing a filament. Antennal ratio (tab. I) characterized by relatively great length of p. Ocelli distinct on macropterous females, faint on brachypterous and micropterous females, absent on males. Tip of lacinia (fig. 16) bearing a relatively large outer and small, acute inner prong. Laterocervical sclerite (fig. 27) bordered by three to five setae. Venation of forewings extremely faint, lacking pterostigma; venation of hindwings pronounced. Forewing evenly ciliated with hairs about half length of marginal hairs. Membrane of hindwing ciliated around margin and evenly over apical two-thirds with hairs much shorter than marginal hairs. First abdominal

Figures 22 through 24. *Archipsocus floridanus*, n. sp., micropterous ♀: 22. epiproct, 23. paraproct, 24. laterocervical sclerite.

Figures 25 through 27. *Archipsocus gurneyi*, n. sp., micropterous ♀: 25. epiproct, 26. paraproct, 27. laterocervical sclerite.

Figures 28 through 30. *Archipsocus parvulus*, n. sp., micropterous ♀: 28. epiproct, 29. paraproct, 30. laterocervical sclerite.

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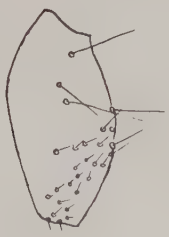

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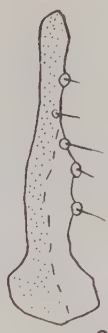

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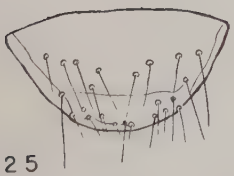

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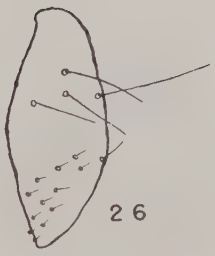

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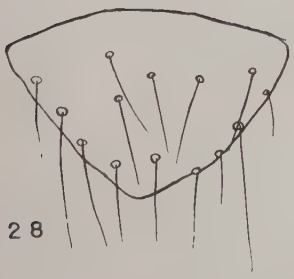

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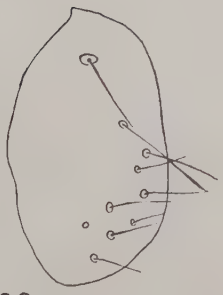

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segment mostly covered dorsally by a sclerotized area with cuticular pigment. Subgenital plate with hairless central marginal thickening. Pigmented area of subgenital plate (fig. 14) with edges of anterior emargination angulate on whole specimen, abruptly rounded on slide mounts. External valves of gonapophyses (fig. 15) rather narrow, bearing 10 to 14 marginal setae. Ventral valve very narrow, straight, with a lancet-shaped tip (fig. 20). Paraproct bearing a trichobothrium in both macropterous and micropterous forms. Epiproct and paraproct ciliated as in figs. 25 and 26.

Color: head, thorax, and terminal abdominal segments brick red (pigment subcuticular), appearing granular due to overlay of small brown cuticular spots. Antennae concolorus with head. Legs and wings pale brown.

ALLOTYPE MALE: MICROPTEROUS

Measurments: total body length 1.45 mm.; forewing length 0.16 mm.; antennal length 0.53 mm.; hind leg: femur + trochanter 0.35 mm., tibia 0.36 mm.

Differs from holotype in smaller size and microptery. Phallic frame (fig. 8 of paratype) with obtuse-angular aedeagal arch.

VARIATION: micropterous females occur with forewing length about 0.28 mm., hindwings much shorter. Brachypterous females occur with forewing lengths varying from 0.42 to 0.77 mm.

TYPE LOCALITY: Florida: Alachua County: Newnan's Lake. Holotype and allotype taken November 2, 1952. Paratypes: 10 ♂ ♂, 39 macropterous ♀ ♀, 3 brachyterous ♀ ♀, 21 micropterous ♀ ♀ collected from March to November at the type locality.

DISPOSITION OF TYPES: same as for *A. floridanus*.

Archipsocus (Archipsocus) panama Gurney, 1939

Through the cooperation of Dr. Gurney, I have been able to compare Florida specimens with paratypes. No real differences are apparent although the antennal ratios derived from paratypes and from Florida specimens (table I) do not agree with the ratio given by Gurney. Florida specimens have been taken in August, September, and October at the following localities: Alachua County: Gainesville (University Horticulture Gardens), Hogtown Creek and U. S. Highway No. 26, Grant's Cave Hammock.

Archipsocus (Archipsocus) nomas Gurney, 1939

Colonies of this species have been found in Florida throughout the year, but in largest numbers in late summer and autumn, at the following localities: Alachua County: Gainesville, Lake Alice, Cross Creek, Newnan's Lake; Highlands County: Highlands Hammock State Park; Putnam County: Lake George; Sarasota County: Myakka River State Park.

Archipsocus (Archipsocopsis) parvulus, n. sp.

DIAGNOSIS: the smallest known species of *Archipsocus*. Differs from *A. fernandi* Pmn. (1934) of Ceylon and *A. albofasciatus* Bad. (1949) of Belgian Congo in uniform coloration of forewings, smaller size, and shape of lacinia tips. Differs from *A. biguttatus* Pmn. (1936) of Ceylon, and the Belgian Congo species *A. mendax* Bad. (1948), and *A. Balli* Bad. (1948) in shape of phallic frame, laterocervical sclerite, and tip of lacinia. Differs from *A. biguttatus* also in distribution of brown sclerotized areas of abdominal tergites. Differs from *A. aneura* Bad. (1948) of Belgian Congo in shape of lacinia tip and much smaller size.

HOLOTYPE FEMALE: MACROPTEROUS

Measurements: total body length 0.99 mm.; forewing length 0.86 mm.; antennal length 0.46 mm.; hind leg: femur + trochanter 0.22 mm., tibia 0.28 mm.

Morphology (from paratypes and holotypes): antenna: f_1 with single median discoid sensilla. Discoid sensillae of f_1, f_6, and f_{10} apical. Antennal ratio (Tab. I) marked by approach to equality of segments f_2 to f_{10}. Ocelli very small (anterior absent) in micropterous forms, well developed in macropterous forms. Tip of lacinia (fig. 18) with a median and a slightly cleft lateral prong. Laterocervical sclerite (fig. 30) slender, bearing two cilia. Venation of forewing obscure apically. Forewing membrane uniformly ciliated except for bare areas bordering An and base of R. Ciliation of hindwing membrane confined to apical one-third. Abdomen with two small sclerotized areas pigmented in the cuticle at extreme base of first tergite. Pigmented area of subgenital plate shaped as in fig. 17. Paraproct ciliated as in fig. 29, lacking trichobothria even in macropterous form. Epiproct ciliated as in fig. 28.

Color: head, thorax, and terminal abdominal segments brown, darkest on head. Legs, antennae, and pair of basal, dorsal spots on abdomen concolorous with thorax. Remainder of abdomen brick red (sub-cuticular pigment), appearing granular due to overlay of small brown cuticular spots at bases of hairs.

ALLOTYPE MALE: COMPLETELY APTEROUS

Measurements: total body length 0.94 mm.; antennal length 0.38 mm.; hind leg: femur + trochanter 0.18 mm., tibia 0.20 mm.

Differs from holotype in smaller size and complete lack of wings except for minute fleshy knobs at forewing positions. The peculiar shape of the aedeagal arch (fig. 4 of paratype) is probably diagnostic for the species.

VARIATION: micropterous females have forewings averaging 0.11 mm. in length, hindwings somewhat shorter. Brachypterous females occur with forewings averaging 0.36 mm. in length, hindwings somewhat shorter.

TYPE LOCALITY: Florida: Alachua County: Lake Alice. Holotype and allotype collected July 10, 1953. Paratypes: 19 ♂♂, 22 macropterous ♀♀, 4 brachypterous ♀♀, 69 micropterous ♀♀ taken from March to November

at the following Florida localities: Alachua County: University Horticulture Gardens, Lake Alice, Newnan's Lake; Sarasota County: Myakka River State Park.

DISPOSITION OF TYPES: same as for *A. floridanus*.

LITERATURE CITED

Badonnel, A. 1946. Psocoptères du Congo Belge. Rev. Zool. Bot. Afr. 39: 172-174, figs. 68-74.

———1948. Psocoptères du Congo Belge (2e note). Rev. Zool. Bot. Afr. 40: 294-302, figs. 59-95.

———1949. Psocoptères du Congo Belge (3e note). Inst. roy. Sci. nat. Belg., Bul. 25: 42-52, figs. 59-68.

Enderlein, G. 1911. *Archipsocus dextor* [sic] nov. spec., eine Gespinste anfertigende Copeognathe aus Ostafrika. Zool. Anz. 37: 142-144, 2 figs.

Gurney, A. B. 1939. Nomenclatorial notes on Corrodentia with descriptions of two new species of *Archipsocus*. Wash. Ac. Sci., Jour. 29(11): 501-515, figs. 1-14.

Pearman, J. V. 1934. A new species of *Archipsocus* (Psocoptera). Stylops. 3: 112-113, 7 figs.

———1936. Two new psocids from Ceylon. Ceylon Jour. Sci., B. Zool. and Geol. 20: 1-4, pl. 1, figs. 1-6.

INSECTS: THEIR SECRET WORLD, by Evelyn Cheesman. 246 pp., illustrated. William Sloane Associates, New York. Price $3.50.

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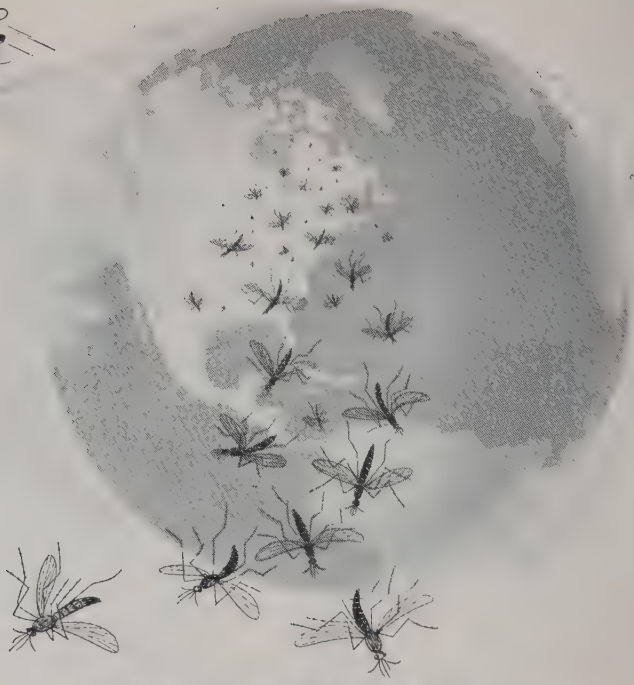

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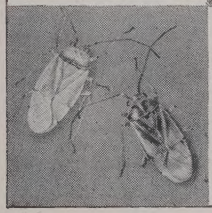

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goat lice
hog lice
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leafhoppers
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